

many reasons that will be addressed individually below.

Claim 19 stands rejected as being obvious over the combination of Clawson in view of Narumiya et al.

Claims 1-6, 10-12, and 16-18 stand rejected as being obvious over the combination of Clawson in view of Narumiya et al and further in view of Setzer et al '484.

Claims 13-15 stand rejected as being obvious over Clawson in view of Narumiya et al, further in view of Setzer et al '484 and still further in view of Sheller.

Claims 20 and 22 stand rejected as being obvious over Setzer et al '578 in view of Narumiya et al.

Claims 1, 7-9 and 21 stand rejected as being obvious over Clawson in view of Narumiya et al and further in view of Setzer et al '578.

All of the claims, as originally filed, stand rejected.

OBJECTIONS TO THE SPECIFICATION

The Examiner has objected to the specification due to the alleged use of the phrase "catalyzed calls" (page 2, OA) throughout the specification. This phrase does not appear anywhere in the specification. This objection is therefore groundless. Appropriate clarification is required if the Examiner persists in this objection.

OBJECTIONS TO THE DRAWINGS

The drawings have been objected to for a number of reasons. The Examiner states that a high temperature-compatible metal support is not shown in the drawings, and that a source of electrical current connected to the support is not shown in the drawings. FIG. 1 has been amended to show the electrical current source, and the foam support is certainly shown in the drawings. It is the catalyst bed, and it is identified by the numeral 2. The tendrils 4 are clearly indicated on the substitute FIG.

1. There are no longer plural numerals 8 on the substitute FIG. 1, thus the "end 8" is clearly shown in the drawing. The reference numeral 10 clearly points to the opposite end of the catalyst bed from the end 8. We would advise the Examiner to pay close attention to the specification when interpreting what the drawings show. If the specification states that the numeral 10 refers to one end of the bed 2 and the numeral 8 refers to the opposite end of the bed 2, then the Examiner has no standing to dispute this fact. The fact that the numeral 8 is clearly identified in the specification as indicating the inlet end of the bed 2 belies the veracity of the Examiner's argument that the fact that the lead line in FIG. 2 ends up perhaps 1/16th of an inch inside of the inlet end of the catalyst bed 2 obfuscates what the numeral 8 refers to. **This is a ridiculous argument.**

The specification has been amended to refer to the letter D which is shown in FIG. 2 of the drawings. The reference numerals 2 and 10 do not refer generally to the catalyst bed. The drawings must be interpreted in light of the specification. If the specification states that the numeral 10 refers to one end of the catalyst bed, and that the numeral 2 refers to the catalyst bed in general, **then that's what they refer to.**

Correction of the drawings as regards the numerals 2, 8 and 10 and their respective lead lines is not required.

In summary, regarding the Examiner's comments relating to the drawings, the tendrils 4 have been identified in the newly submitted FIG. 1. A source of electrical energy (a battery) has been added to FIG. 1. A specific reference to the letter D has been added to the specification. The remaining objections to the drawings are not well taken and should be withdrawn.

OBJECTIONS TO THE CLAIMS

The various objections to the claims have been addressed by amendments to the claims, and have thus been rendered moot.

THE 35 USC §112, SECOND PARAGRAPH REJECTIONS:

The §112 rejections will be addressed hereinafter in the order presented by the Examiner, beginning with Para. 8 on page 4 of the office action.

Before we address specific rejections put forth by the Examiner, we note that many of the rejections under this section of the statute are based on allegations by the Examiner that he or she does not understand what is being claimed. This is not the test for compliance with 35 USC §112, second paragraph. The 35 USC 112 requirement of definiteness of claim language is essentially a requirement for precision and definiteness of claim language so that the claims make clear what subject matter they encompass, and thus what the patent precludes others from doing. See: In re Spiller, 182 USPQ 614 (CCPA 1974); and In re Conley, 180 USPQ 454 (CCPA 1974). This section of the statute is directed to those skilled in the art in question, not to examiners in the USPTO.

Claims cannot be read in a vacuum, but must be read in light of application disclosure and teachings of prior art; second paragraph of 35 USC 112 requires merely that claims set forth and circumscribe particular area with reasonable degree of precision and particularity, and that applicants claim that which they consider to be their invention. See: Ex parte Calhoun and Bennett, 195 USPQ 455 (PTO Bd. App. 1976); and In re Johnson and Farnham, 194 USPQ 187 (CCPA 1977).

8. The rejections of Claims 1 and 20-22 are based on the allegation that the inclusion of the phrase "is operable" renders the claims indefinite. The Examiner uses the phrase "passive voice" in formulating the rejection. We do not know what a "passive voice" is, however, we submit that the recitation of functions of a claimed structure does not render the claims indefinite in and of itself. The Court of Customs and Patent Appeals has stated in In re Miller, 169 USPQ 597, at 599 (CCPA 1971) that: "there is no merit in any proposition which would require the denial of the claim solely because of the type of language used to define the subject matter of which patent protection is sought.". Thus, in the case of an apparatus claim, the use of a functional "type of language" cannot, per se, and without more, support a rejection of that claim under the statute. Note that the Court used the phrase "**any proposition**".

See also: In re Swinehart, 169 USPQ 226, at 228 (CCPA 1971) wherein the Court stated that the word "Functional" indicates nothing more than the fact that an attempt is being made to define something by what it does rather than by what it is. The Court found nothing intrinsically wrong with the use of such a technique in drafting patent claims. See also: In re Benson, 164 USPQ 22 (CCPA 1969); ZMI Corp. v. Cardiac Resuscitator Corp., 6 USPQ 2nd 1557 (Fe. Cir. 1988); and Intel Corp. v. U.S. International Trade Commission, 20 USPQ 2nd 1161 (Fed. Cir. 1991).

In In re Halleck, 164 USPQ 647 (CCPA 1970), the Court specifically recognized the practical necessity of using functional language in patent claims.

If there is a catalyst in an inlet portion of the catalyst bed which causes combustion of a portion of the fuel gas, then the claims cover such a structure, assuming that all other claim limitations are met. If there isn't, then the claims don't cover such a structure. It's that simple.

Claims 1 and 20-22 are alleged to be indefinite due to the recitation of "the fuel gas" in line 4 of these claims. With all due respect the thrust of this entire invention relates to the reforming of a "fuel gas". The phrase "fuel gas" is recited in line 1 of each of these claims. This rejection is not well taken. We haven't counted the number of times that the phrase "fuel gas" is used in the specification and claims, but we will if the Examiner persists in this rejection. This rejection is not well taken, and should be withdrawn.

The term "minimizing" has been deleted from Claims 1 and 20-22 and replaced by the term "inhibiting". This rejection has thus been rendered moot.

The Examiner rejects Claims 1 and 20-22 as being indefinite due to the recitation of the phrase "catalyzed calls" in these claims. This phrase does not appear in these claims, thus this rejection is not well taken and should be withdrawn.

The word "core" has been deleted from Claims 1 and 20-22, thereby rendering the

rejection moot which was based on the claim limitation "said foam core".

The Examiner states that the term "whereby" cannot be relied upon to distinguish claimed subject matter from prior art and thus can be ignored in the patentability analysis, citing In re Mason. This argument is flawed. In determining anticipation, functional language, preambles, and language in "whereby", "thereby", and "adapted to" clauses cannot be disregarded. Pac-Tec, Inc. v. Amerace Corp., 14 USPQ2d 1871 (CAFC 1990). Claim limitations cannot be ignored by an Examiner.

The Examiner states that Claims 1 and 21 are indefinite due to the inclusion of the phrase "will be" in the claims. If this phrase renders the entire claim clause in which it appears indefinite, then the Examiner has the burden of proof in providing a clear and convincing argument grounded on solid facts to that effect. Does the Examiner seriously contend that one skilled in the art in question will not understand what heat exchangers do, and how heat will be transferred from one gas stream to another?

Claims 1 and 21 have been amended to render moot the rejection based on the inclusion of the phrase "the processed gas stream" in these claims.

In Claim 2, "catalyst" has been amended to read "catalyst bed" thereby rendering moot the rejection of Claim 2.

Claim 7 has been amended to render moot the rejection of this claim found on page 6 of the office action.

Claim 8 has been canceled thus rendering moot the rejections of this claim in the office action.

The rejection of Claim 15 is based on the Examiner's allegation that the language of Claim 15 is merely functional, and therefore renders the claim's scope "unclear" to the Examiner. As noted above, whether a claim is unclear to an Examiner is irrelevant under §112, 2nd paragraph. Regarding the use of functional language in a claim, see:

In re Swinehart, 169 USPQ 226, at 228 (CCPA 1971) wherein the Court stated that the word "Functional" indicates nothing more than the fact that an attempt is being made to define something by what it does rather than by what it is. The Court found nothing intrinsically wrong with the use of such a technique in drafting patent claims. See also: In re Benson, 164 USPQ 22 (CCPA 1969); ZMI Corp. v. Cardiac Resuscitator Corp., 6 USPQ 2nd 1557 (Fe. Cir. 1988); and Intel Corp. v. U.S. International Trade Commission, 20 USPQ 2nd 1161 (Fed. Cir. 1991). In In re Halleck, 164 USPQ 647 (CCPA 1970), the Court specifically recognized the practical necessity of using functional language in patent claims. This rejection is thus traversed and should be withdrawn.

The cancellation of Claim 8 and the amendment of Claim 9 has rendered the two rejections of Claim 9 moot. This rejection should thus be withdrawn.

The rejection of Claims 10 and 11 have been rendered moot since the phrase "noble metal catalyst" is recited in line 2 of Claim 10 as amended.

The rejections of Claim 13 have been rendered moot by the aforesaid amendments of the claim.

The amendment of Claim 14 to change its dependency has rendered the rejections of Claims 14 and 15 moot.

The word "quick" has been deleted from Claims 21 and 22 thereby rendering the rejection of these claims based on the inclusion of this term moot.

In Claims 21 and 22 the term "reformer" has been amended to recite the phrase "reformer assembly", thereby rendering the rejection of these claims for lack of antecedence moot.

9) Claims 1-22 have been rejected under §112, second paragraph as being incomplete, the Examiner citing MPEP § 2172.01 as supporting this rejection. The

Examiner states that the claims in question are "incomplete for omitting essential structural **c o p r a t i v e** relationships of elements" (emphasis added). The section of the MPEP cited by the Examiner refers to the lack of essential cooperative relationships of elements in a claim as supporting a §112, first paragraph rejection, not a §112, second paragraph rejection. Thus the Examiner seems to be confusing the two paragraphs of §112 and the guidance provided by the cited section of the MPEP. In any event, Applicants traverse the grounds for this rejection. Specifically, the Examiner seems to be alleging that one skilled in the art in question would be unaware of the meaning of the phrase "being provided with", and unaware of the meaning of the term "deposited", which should really be "deposited in". Has the Examiner bothered to consult a dictionary as to the meaning of the term "provided"? It is synonymous with the word "supplied". Does the Examiner seriously contend that one skilled in the art in question would not understand what the phrase "deposited in" means? The Examiner has suggested that certain structural features of the catalyst bed would be necessary to allow the foam catalyst bed to be provided with a first catalyst, and to allow the catalyst bed to have a fuel gas reforming catalyst deposited on it. **What are these necessary structural features?**

The allegations that the phrase "being disposed in heat exchange relationship" is not a positive structural recitation is ridiculous. Has the Examiner ever put his or her hand on something hot or cold? If he or she has, then the hand was in a "heat exchange relationship" with the hot or cold something. Heat exchange relationship simply means that heat can be transferred from something to something else due to the physical relationship between the something and the something else. Understanding a heat transfer relationship is not rocket science.

The Examiner is, in effect, characterizing one skilled in the art of hydrocarbon fuel gas autothermal reforming as an idiot, in some respects in the aforesaid rejections. The Examiner **must always bear in mind** when postulating §112, 2nd paragraph rejections of claims, the test is: What would one skilled in the art in question understand the claims to circumscribe?

We have gone to great lengths here to address all of the §112, second paragraph rejections, some of which are well grounded, but many of which are not well grounded.

THE 35 USC §103 REJECTIONS

11) Claim 19 stands rejected as being obvious over the combination of Clawson and Narumiya et al. Clawson discloses a catalytic steam reformer and Narumiya et al discloses a catalytic converter for purifying burner exhaust gases. The Clawson reference uses a noble metal and/or nickel catalyst which is supported on a refractory carrier, the physical nature of which is not explained, except that it must be supported and confined by perforate screens. The Narumiya et al reference describes a ceramic foam support which has an activated alumina coating on it wherein the alumina coating is covered by a noble metal oxidizing catalyst. The smelly components and the CO in the burner exhaust being purified are oxidized, or burned, in the catalyst bed. The motivation put forth by the Examiner for substituting the Narumiya et al catalyst bed for the Clawson catalyst bed is to provide a catalyst bed which allows the fuel gas to always be in contact with the surface of the catalyst, to accelerate gas diffusion, and to prevent the direct passage of unreacted gas. It would appear that none of these problems exist in the Clawson reformer, and thus there is no motivation to substitute the Narumiya et al catalyst bed for the Clawson catalyst bed. Furthermore, one would not be likely to use an oxidizing catalyst bed in a steam reformer for a hydrocarbon fuel gas. If one did make such a substitution, the result would be to oxidize or burn all of the hydrocarbons in the fuel gas, which would be an undesirable in a steam reformer.

12) Claims 1-6, 10-12 and 16-18 stand rejected as being obvious over the combination of Clawson and Nuramiya et al in view of Setzer et al '484. The Examiner's characterization of details of the Clawson structure is incorrect. The fuel gas inlet line in Clawson is denoted by the numeral 219, not 208. The numeral 208 denotes the initial portion of the catalyst bed and is filled with a catalyst 214. The fuel comes from a source 217, passes through the line 219 and enters the initial portion 208 of the catalyst bed. Oxygen (air) enters the reformer 200 through a line 235 from an oxygen source 242. The air passes through a helical tube 232 which is disposed in

an annular chamber which doesn't seem to be numbered. The partially reformed gas stream passes through the annular chamber and then passes into a second catalyst bed 262. Thus, the air stream in the helical tube 232 is disposed in heat exchange relationship with the partially reformed gas stream, but the fuel gas inlet passage 219 is not disposed in heat exchange relationship with the partially reformed gas stream. Thus, pre-heating of the fuel gas stream, as claimed in this application, does not occur in Clawson.

We agree that Setzer et al '484 describes an autothermal reformer with a two stage catalyst bed. We do not agree that Setzer et al '484 describes a foam core catalyst bed as implied on page 11 of the office action. Setzer et al clearly describes a pelletized catalyst bed. See Claim 2 of Setzer et al.

The rejections of Claims 1-6, 10-12 and 16-18 contained in section 12 of the office action are thus flawed since they are based on an erroneous interpretation of the principal reference, Clawson. This rejection should thus be reconsidered and withdrawn.

13) Claims 13-15 stand rejected as being obvious over the combined teachings of Clawson in view of Narumiya et al and Setzer et al '484, and further in view of Sheller. The Examiner characterizes the Sheller reference as disclosing a "monolithic" catalyst bed. This is not correct. The Sheller catalyst bed is formed from a plurality of corrugated metal strips, and is not a one-piece (monolithic) member. The rejected claims are all dependent from Claim 1, and thus include all of the limitations of Claim 1. As noted above in connection with section 12 of the office action, the Examiner's analysis of the Clawson reference is erroneous, thus this rejection is also based on an erroneous interpretation of Clawson. This rejection should thus be reconsidered and withdrawn.

14) Claims 20 and 22 stand rejected as being obvious over the combination of Setzer et al '578 in view of Narumiya et al. The Examiner also refers to a Peters '780 reference, but does not explicitly rely on that reference in the rejection. The

cancellation of Claim 20 renders the rejection of that claim moot. Regarding Claim 22, the claim requires combustion of a portion of the fuel gas at a temperature of about 500°F to enable start-up of the reformer assembly. We have carefully reviewed the Examiner's reasoning for finding the 500°F start-up temperature somewhere in the combination of the references, but are at a loss to understand where the Examiner finds this start-up temperature, other than in the instant application. The only reference in the three, or perhaps four, references relied upon by the Examiner that suggests any start-up temperature for a reformer is the Setzer et al reference which suggests in FIG. 3 a start-up temperature of about 1,250°F. The Setzer et al reference system is thus apparently not able to operate at a system start-up temperature of 500°F, or anything even close thereto.

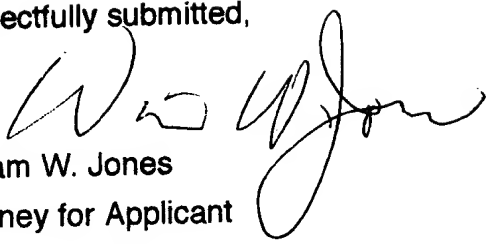
The grounds for rejecting this claim are thus flawed, and the rejection should be reconsidered and withdrawn.

15) Claims 1, 7-9 and 21 stand rejected as being obvious over the combination of Clawson and Nuramiya et al in view of Setzer et al '578. As noted above the Examiner's analysis of Clawson is flawed, and the analysis of the start-up temperature suggested in Setzer et al '578 is likewise flawed. This rejection should therefore be reconsidered and withdrawn.

As noted above, none of the claims have been allowed and the rejections of all of the claims, save Claim 8 and Claim 20 which have been canceled, have been traversed. The objections to the claims, specification and drawings have been addressed, and should be withdrawn. As noted above, a new drawing sheet is enclosed herewith.

In view of the amendments to the claims, and the arguments advanced in support thereof, it is respectfully submitted that the remaining claims are allowable over the art that has been cited and applied by the Examiner in this application. Early notice to that effect is courteously requested.

Respectfully submitted,


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